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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,185	11/18/2003	Jeffrey Peter Allen	05046-00035	4141
22910 7590 05/03/2007 BANNER & WITCOFF, LTD. 28 STATE STREET 28th FLOOR BOSTON, MA 02109-9601			EXAMINER ECHELMAYER, ALIX ELIZABETH	
			ART UNIT 1745	PAPER NUMBER
			MAIL DATE 05/03/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/716,185	<b>Applicant(s)</b> ALLEN ET AL.	
	<b>Examiner</b> Alix Elizabeth Echelmeyer	<b>Art Unit</b> 1745	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 April 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
       Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
       Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 17, 2007 has been entered.
2. Claims 1, 3 and 9 have been amended. Claims 1-15 are pending and are rejected for the reasons given below.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlstrom (US Patent Number 7,029,784) in view of Franklin et al. (US Pre-Grant Publication 2002/0022170), Baker (US Patent Number 4,877,693) and Anderson (US Patent 2,143,171).

Carlstrom teaches a flow field plate with at least two interlocking layers forming internal channels between them. The first layer includes first lands and first channels.

The second layer includes second lands and second channels. The plates interlock to form a series of third channels. The first channel is intended to carry fuel and the second to carry oxidant (abstract; Figure 1; column 3 lines 1-24).

Although Carlstrom does not explicitly teach the edge areas at the opposing ends of the plates, the plates are not infinite and therefore end at some point. At that point, they form edge areas.

Regarding claims 1 and 9, Carlstrom fails to teach internal fuel manifolds, either a single one or a plurality of manifolds. Franklin et al. teach either a single or multiple manifold(s) for the delivery and removal of reactants and reactant products to and from the separator plate (abstract; claim 2 of Franklin et al.).

The manifolds of Franklin et al. would improve the separator plate of Carlstrom by allowing for delivery and removal of reactants and reactant products to and from the separator plate.

Therefore, it would have been obvious to one having ordinary skill in the art to combine the manifold(s) of Franklin et al. with the separator plate of Carlstrom in order to aid delivery and removal of reactants and reactant products.

Carlstrom also fails to teach the turnaround plenum in fluid communication with the center flow channels and the anode flow channels.

Baker teaches the passage of fuel through fuel chambers that are coupled to entry ports of anode chambers. The fuel passes through the first chamber, enters a manifold, and then makes a u-turn into the anode passages (Figure 1; column 3 lines 1-29).

The turnaround plenum of the instant application and the manifold of Baker solve the same problem of directing fuel from a first chamber to a second chamber, without contamination, where it can facilitate the reaction of the fuel cell.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the manifold and port coupling of Baker in the separator plate of the Carlstrom in order to direct fuel from one chamber to another.

As for the nesting of the flow field plates to define center flow channels, Carlstrom fails to teach that a height of the ribs on the first plate is less than the height of the ribs on the second plate.

Anderson teaches an assembly for containing refrigerant to be in fluid communication with two headers (Figure 1; column 2 lines 48-52). The apparatus is made of two plates having nesting corrugations (Figure 2; column 1 lines 12-16; column 2 lines 5-6)

Anderson further teaches that having nesting corrugations in the plates is desirable since it improves the safety of the apparatus. Since liquid and/or gas is contained in the assembly, as is in the separator of Carlstrom, a more rigid structure is desired to prevent rupture (column 3 lines 34-43).

Although Anderson is not within the fuel cell art, the reference is concerned with directing fluid between two plates, as is taught in Carlstrom.

It would have been advantageous to use the nesting corrugations of Anderson in the separator of Carlstrom since the nesting corrugations structure is safer since the added rigidity helps to prevent rupture.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the nesting corrugations of Anderson in the separator of Carlstrom since the nesting corrugations structure is safer since the added rigidity helps to prevent rupture.

Regarding claims 2 and 10, Carlstrom in view of Franklin et al. teaches the separator plate assembly but fails to teach the use of a catalyst in the first fuel flow passages.

Baker teaches that the first fuel flow passages, discussed above, contain a catalyst. Baker further teaches that the internal reforming of fuel is advantageous because it eliminates the need for external fuel processing, thereby increasing the efficiency of the system (column 1 lines 23-29).

The use of a catalyst in the first fuel flow chamber of the separator plate taught by Carlstrom, Franklin et al., and Baker is advantageous because it eliminates the need for external fuel processing and increases the efficiency of the system.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add the catalyst to the first fuel passage chambers of the separator plate of Carlstrom, Franklin et al., and Baker in order to increase the efficiency of the system by eliminating the need for external fuel processing.

As for claims 3 and 11, the turnaround portion taught by Baker includes an input port and manifold fluidly connecting the first fuel flow passage with the second.

With regard to claims 4 and 12, Carlstrom in view of Franklin et al. teach a separator plate that is bent over at the ends to support the seals (Franklin et al., [0083]).

Regarding claim 5, Carlstrom in view of Franklin et al. teaches the multiple manifolds, or segments, that internally connect to the first and second sets of passages.

As for claims 6 and 13, it can be seen in Figure 5 of Carlstrom that the internal flow channels are substantially parallel to the flow path of the bipolar plate since the internal channels are created by the flow path channels of the nested plates.

5. Claims 7, 8, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlstrom, Franklin et al., Baker and Anderson as applied to claims 1 and 9 above, and further in view of Jones (US Patent Number 6,007,933).

The teachings of Carlstrom, Franklin et al., Baker and Anderson as described above are incorporated herein.

Carlstrom, Franklin et al., Baker and Anderson teach the separator plate but fail to teach the plurality of flat wires on the surface of the first sheet and an electrode positioned on the wires.

Jones teaches wires disposed between the bipolar plate and electrode to distribute reactants and products and to provide deformability and resiliency in the cell (column 2 lines 15-21).

The combination of the wires and electrode of Jones with the separator plate of Carlstrom, Franklin et al., Baker and Anderson is desirable because it helps with the

distribution of reactants and products and provides deformability and resiliency in the cell.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the wires and electrode of Jones with the separator plate disclosed above in order to distribute the reactants and products and to provide deformability and resiliency in the cell.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1 and 9 have been considered but are moot in view of the new grounds of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.




Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer  
Examiner  
Art Unit 1745

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PRIMARY EXAMINER